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ORIGINAL ARTICLE

A cross-cultural analysis of posthumous reproduction: The significance of the gender and margins-of-life perspectives

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Abstract The scholarly discussion of posthumous reproduction (PHR) focuses on informed consent and the welfare of the future child, for the most part overlooking cultural differences between societies. Based on a cross-cultural comparison of legal and regulatory documents, analysis of pivotal cases and study of scholarly and media discussions in Israel and Germany, this paper analyses the relevant ethical and policy issues, and questions how cultural differences shape the practice of PHR. The findings challenge the common classifications of PHR by highlighting the gender perspective and adding brain-dead pregnant women to the debate. Based on this study's findings, four neglected cultural factors affecting social attitudes towards PHR are identified: (i) the relationship between the pregnant woman and her future child; (ii) what constitutes the beginning of life; (iii) what constitutes dying; and (iv) the social agent(s) seeking to have the future child. The paper argues that PHR can be better understood by adding the gender

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and margins-of-life perspectives, and that future ethical and practical discussions of this issue could benefit from the criteria emerging from this cross-cultural analysis.

KEYWORDS: brain death, ethics, gender, Germany, Israel, posthumous reproduction

Introduction

Mary Shelley's Dr Frankenstein created the first human being from posthumous tissue and body parts 'snatched' from graves and slaughterhouses. Shelley, like her fictional hero Frankenstein, was fascinated by the newly emerging idea in the 18th century that the transition from life to death could be reversed. The science and literature of the period were both preoccupied with the notion that electricity and other modern technology could revive dead people, prolong life or create new beings. However, since then the monster has also come to symbolize the 'yuck factor' (Kass, 1997) – people's instinctive repugnance towards radical scientific ideas such as cloning, genetic manipulation of organisms or posthumous reproduction.

Posthumous reproduction (PHR) is commonly used to refer to the intentional application of advanced medical technologies to achieve conception, pregnancy and childbirth in a situation where one or both parents is declared dead. It is distinguished from posthumous childbirth, which has been a common tragedy since time immemorial and is well documented in royal family genealogies where fathers died in wars or mothers died in labour (Elliot, 2004). The ancient Greek god Asclepius – god of medicine – can be considered a child born posthumously when Hermes cuts him out of the body of his dying mother Coronis. In the continuation of the Greek myth, Asclepius even revives a dead person. This ultimate power of medical knowledge continues in late-modern ideas of life extension or life creation.

Modern technology has problematized both borders of life. With the introduction of IVF, the beginning of life has left the human body and can occur in a laboratory, raising heated debate about the acceptability of destroying 'pre-embryos' and using embryonic stem cells. Likewise, the accumulated scientific knowledge regarding the different developmental stages of the embryo and the fetus has prompted ongoing deliberations about their moral status. The fact that human gametes as well as pre-embryos can now be frozen and stored further problematizes the question of the beginning of life and its possible manipulations.

At the other edge of the spectrum, the end of life has also become less self-evident. Life-support technologies and medically assisted suicide challenge our moral understanding of the dying human being, and raise critical questions as to whether and how to control the end of life. Modern medical diagnoses such as brain death confront us with new criteria for human death and raise questions of whether such dead bodies can legitimately be used by others (Hauser-Schäublin et al., 2001; Lock, 1995).

Having said that, some very difficult and disturbing situations occur when death and birth come close to one another. Modern medical technology is breaking down the boundaries between the beginning and end of life not only symbolically but very literally, in real-life experiences. Life and death are now interconnected intentionally – unlike the historical cases of posthumous childbirth, which were unplanned. Current cases of PHR involve a search for opportunities to bring a new life into being 'by a parent from the grave' (Hans, 2008). These cases are based on advanced medical technologies that allow for the use of reproductive tissues stored outside the human body in the laboratory (via IVF), or that permit human bodies already declared dead to be kept 'alive' artificially in order to retrieve gametes or sustain the fetus in a female body until birth.

The aim of this paper is to provide a conceptual analysis of PHR and the form it takes in different cultural contexts, with emphasis on Israel and Germany. These two countries, both at the cutting edge of Western medical technology, generally represent opposing poles of professional culture, regulation and policy in the field of biomedicine and specifically with regard to stem cell research, preimplantation genetic diagnosis (PGD), genetic screening and euthanasia (Hashiloni-Dolev, 2007; Hashiloni-Dolev and Shkedi, 2007; Prainsack, 2006; Raz and Schicktanz, 2009, 2016). In the case of PHR, Israeli policy is commonly understood as extremely liberal, whereas German policy is considered restrictive. In the following examination of these societies, the common classifications of which situations constitute PHR scenarios is challenged, highlighting the gender perspective and adding brain-dead pregnant women to the debate, and shows what both of these countries, with their almost diametrically opposed policies regarding PHR, can teach us about the lacunae in each society as well as in the international scholarly discussion of the topic. It will be argued that PHR can be better understood by adding the gender and margins-of-life perspectives, and that future ethical and practical discussions of this issue could benefit from the criteria emerging from this cross-cultural analysis. The analysis is based on a cross-cultural comparison of PHR regulations, analysis of seminal cases and the study of expert and public discussions.

Materials and methods

Comparative methodology is 'a means of investigating the interactions between science and politics, with far-reaching implications for governance in advanced industrial democracies' (Jasanoff, 2005, 15). Comparisons between different national and cultural milieux allow for better understanding of the interplay between formative technological and cultural forces, since the act of seeing the image of one's own culture reflected in and by another has the potential to create fertile epistemological distancing in which the familiar is seen and understood in a new light (Øyen, 2004). Comparative research in bioethics contributes to a more

self-reflective, culturally sensitive methodology that overcomes simplistic, normatively loaded generalizations. The juxtaposition of PHR discourse in Israel and Germany allows us to highlight the distinctions in their moral and legal assessments of biomedicine from a fresh perspective.

Using a cross-cultural comparative analysis of ethical reasoning and policy making with respect to PHR, we can reveal conceptual problems often neglected in the ethics literature, and in fact re-examine the category itself: how PHR is thought of and understood, on what grounds it is accepted or rejected and what is at stake when that happens.

The comparison in this study is based on a desk study of multi-source documents such as policy papers, legal statements, media presentations and academic literature from sociology, bioethics and law in both countries from 1989 (for Israel) and 1990 (for Germany) to 2015 (for both). Whereas public and legal discussions about PHR started in Israel in about the year 2000, cases in which pregnant women became severely ill or injured during pregnancy, endangering their lives and the continuation of the pregnancy, were first addressed legally in Israel and Germany roughly ten years earlier; hence, the choice of respective starting points.

Since this study deals with cultural attitudes towards PHR, it is methodologically necessary not to focus solely on current cases but to remain sensitive to the subtle development of the legal, political and public debate, which often evolved over the course of one or more decades. Moreover, historical events can often contain a hidden cultural legacy. Therefore, when methodologically possible it is preferable to place a comparative approach in a diachronic framework rather than to adopt a synchronic perspective (see also on this point: Banchoff, 2011; Squier, 2004). The selected time frame takes such a diachronic process into consideration.

The literature search for this study was based on two data banks: PubMed and IDEM Ethicsline, a European platform. We first searched for international overview articles about PHR as well as for papers dealing specifically with the Israeli and German cases. For each country, a systematic search was conducted in national data banks (see below) in addition to internet searches using German and Hebrew keywords. Key PHR cases that set legal precedents and/or reached the headlines and were followed by wide-ranging media and academic discussion were also reviewed.

With regard to PHR in Israel, the lead author of the present paper has been studying regulation, public opinion and legal cases in this area for several years (Hashiloni-Dolev, 2015; Hashiloni-Dolev and Triger, 2016). For this study, an internet search was conducted for any academic or popular publications about brain death and pregnancy in Israel, since the initial search found very different classifications used in the two countries. The Israeli search revealed three pivotal and precedent-setting cases in which parents of deceased young men sought to become posthumous grandparents (a 2002 case involving the retrieval of sperm from a fallen soldier; a somewhat similar case, where the prospective father died of cancer [2009]; and a 2011 case where the deceased signed a biological will declaring his wishes). Two other cases of disputes between a widow and parents over the sperm of the deceased, and a recent Israeli case in which parents were given the right to have a grandchild and raise him/her on their own, with no mother involved, will also be referred to below.

In the case of Germany, a systematic search was conducted in the data bank of the German Reference Centre for Ethics in the Life Sciences (DRZE) for all references to PHR since 1990. A media search for this period was conducted via the internet archives of three leading publications: *Die Zeit*, *Die Frankfurter Allgemeine Zeitung* and *Der Spiegel*. An internet search to identify important cases similar to the criteria for the Israeli ones yielded the following: a baby born via Caesarean section at the Filderklinik anthroposophical clinic in 1991, after the mother had been brain dead for 10 weeks; the intensively discussed 1992 case of the 'Erlanger baby', involving an 18-year-old brain-dead woman; and the 2009 case concerning the implantation of frozen zygotes in a woman following her husband's death.

The selected materials were analysed systematically with respect to the following questions: (i) What is defined as PHR in each country? (ii) How are opinions and decisions concerning the different cases justified? (iii) What kinds of ethical, legal and social aspects are addressed, and which are not? and (iv) How do ethical-legal debates from related areas such as reproductive medicine and end-of-life decisions influence the debate on PHR? A potential limitation of this study is the fact that it is based on a relatively small number of cases, since PHR is not a common situation. The above notwithstanding, more cases may have taken place, but these have not been publicized and hence could not be studied.

A typology of posthumous reproduction scenarios *and* related social-ethical concerns

Posthumous reproduction touches upon the two critical points of the end and the beginning of life, enabling death to invade life and vice versa. Nowadays cryobiology exploits a certain plasticity of biological organisms, and allows for the freezing of living tissues such that they are still alive when thawed. In doing so, life becomes suspendible, interruptible, storable and freezable, and biological matter can go on living and reproducing despite catastrophic interference in its constitution, environment or form (Landecker, 2007, 10). By extending fertility beyond death, PHR overcomes the ultimate catastrophe and allows reproduction to take place even after a genetic parent has died.

The implications of PHR are immense, as they affect grieving individuals, future family structures and children, and our social and moral order as well as common anthropological categories of life/death and the ethics of their differentiation and manipulation. Tearing down the walls between life and death may hold great promise for a certain form of eternal life, but at the same time, being born from the dead may also be associated with necrophilia, incest or 'mad scientist'/Frankenstein types of scenarios (Kroløkke and Adrian, 2013). As such, PHR can still be considered an extreme paradigm of late-modern human intervention in our understanding of what makes a human being human. As pointed out already by Hannah Arendt in her book *The Human Condition* ([1958] 1998), the contingency of natality is a major condition for our self-understanding as free-acting beings. Therefore, the crucial question remains of how new biotechnologies may instrumentalize or disturb this process and, if so, whether they can also hamper our self-understanding.

As there is no clear-cut definition of PHR in the current debate, this study proposes describing it as a situation where one or both parents are declared dead, and conception or continuation of pregnancy is made possible only by intentionally applying advanced medical technologies. In our opinion, traditional cases of posthumous childbirth where Caesarean section enables the birth of an already viable fetus from a dying mother, or where a pregnancy is continued even if the father has died since conception, should not be confused with PHR.

For purposes of this paper, we have expanded the use of the term to encompass brain-dead mothers, classifying the instances of PHR into three main scenarios[1]:

(1) Planned gamete PHR – cases where the potential death of a father/mother due to war, other dangerous activity or illness was anticipated. The future parent might have signed an advance directive that attested to his/her post-mortem wishes. Gametes, or even supernumary 'pre-embryos' in the case of former fertility treatments, may have been stored.
(2) Unplanned gamete PHR – cases precipitated by the sudden death of the potential father/mother. Male gametes can be retrieved *post mortem* in the first 36 h after death (Shefi et al., 2006) or they may have been left in a biobank. While the more common scenario involves sperm stored in a sperm bank, there are also a small number of cases where eggs have been frozen, or retrieved *post mortem* from the mother, and of course supernumary pre-embryos can also be stored by fertility clinics. In these cases, no explicit consent of the deceased partner exists.
(3) Brain-death PHR – cases where a pregnant woman is diagnosed as brain dead and thus, in legal terms, is dead. The embryo (first trimester) or an as-yet unviable fetus may develop further and be brought to term by artificial support of the mother's body.

In the international bioethics debate, only the first two cases are viewed as instances of PHR, while the third case is not seen as falling under this rubric. This is due to the different moral status ascribed to the various entities. In the first two cases, only gametes or pre-embryos, which do not yet hold the moral status of a living being, are involved, whereas in the third case the entity is an embryo or fetus that is already seen as a living being. However, it is exactly this universal presumption which can be questioned from a sociocultural perspective. It should be an aim of critical bioethics to engage with social and cultural phenomena rather than neglecting them by basing ourselves on formalistic definitions (Hedgecoe, 2004). For example, various moral positions – partly religious, partly not – do not differentiate between fertilized eggs, in-vitro pre-embryos, and in-vivo embryos or a fetus in the womb, since they promote a theory of continuity in human ontogenesis and moral potentiality and therefore claim moral status from the beginning of such a process (see for example Baertschi and Mauron, 2010). Analytical or utilitarian-oriented theories of gradual personhood instead espouse the idea that the moral status of the embryo/fetus changes categorically with the sensory and cognitive capacities of the living being. Feminist approaches often propose relational or phenomenological positions towards the early stages of life. Thus there exists no consensus within the international ethical and legal discourse, but only a partly pragmatic compromise regarding how to proceed in particular fields such as human embryonic stem cell research or IVF treatment (for an overview of the debate, see Steinbock, 2011).

The approach of this study enables the identification of these underlying conflicts or ambiguities concerning biomedical technologies, which pose a particular challenge to moral positions on the early status of the human being. In the absence of such clarification, the current ethical debate over PHR risks narrowing its reflective vantage point by taking into account only analytical or utilitarian-oriented assumptions about the entities at stake. While our objective is not to defend a particular theory of when or where life or personhood begins or ends, we do wish to critically consider these ready-made categorisations and show how they frame particular perceptions within ethical and medical discourse. Such a perspective is relevant not only for the stem cell or cloning debate, but also for PHR. It also highlights the gender and end of life dimensions of PHR, as will be discussed below.

In the current international literature, the two most commonly discussed PHR scenarios are planned and unplanned gamete PHR following the death of the father. The first situation often occurs when sperm is frozen in advance of cancer treatment or active military service. In the USA, a small number of soldiers have privately frozen their sperm prior to deployment in case they are killed in battle[2], and the same is reportedly true in Israel.[3] Recently, the Pentagon announced a pilot programme to cover the cost of freezing sperm (or eggs) of American troops.[4] This first scenario raises minimal ethical objections, since the gametes are retrieved during the man's life and clear evidence is provided concerning his post-mortem wishes, indicating explicit consent for PHR (Tremellen and Savulescu, 2015). Such consent is required by the major professional organizations in the field, namely the European Society of Human Reproduction and Embryology (ESHRE) (Pennings et al., 2006) and the American Society for Reproductive Medicine (American Society for Reproductive Medicine, Ethics Committee, 2013).

Scenario two involves cases where the sperm of a deceased genetic father was retrieved when he was in a coma, in a vegetative state, brain dead or *post mortem*, due to sudden injury or death (Hans and Yelland, 2013). It also includes circumstances where pre-embryos or gametes of either men or women were stored prior to death (for example, in cases of cancer or fertility treatments), but without clear indications as to what should be done with them in the event of unexpected death. In reality, the

[1] There is also a fourth, more futuristic, scenario of stem-cell PHR, which we will not discuss here in detail, but which should be mentioned: Potentially, ova can be retrieved from embryonic or pluripotent stem cells (Cyranoski, 2014). Such ova can be developed and fertilized to become human infants whose biological mother was never alive (FAZ, 2003).

[2] http://edition.cnn.com/2003/HEALTH/01/30/military.fertility/index.html?iref=newssearch.

[3] http://www.newfamily.org.il/services/biologic-will/ (Hebrew).

[4] http://www.nytimes.com/2016/02/04/us/politics/pentagon-to-offer-plan-to-store-eggs-and-sperm-to-retain-young-troops.html?_r=0.

majority of situations in which PHR is requested are the result of such cases of sudden death, in which the deceased person had never contemplated the matter or expressed any wishes. This raises legal and ethical issues of informed consent for posthumous parenthood as well as for the medical procedure necessary to retrieve gametes in those cases where none were previously stored (Pennings et al., 2006; Tremellen and Savulescu, 2015). Obviously, any requirement for some sort of informed consent in such cases severely limits the use of PHR.

Opponents of PHR generally argue that even if it is known that the deceased clearly wanted to become a father/mother while still alive, this says nothing about the wish for post-mortem parenthood (Bahadur, 2004; Pastuszak et al., 2013; Shalev, 2002). Thus a restrictive agenda holds that the wishes of the deceased should not be presumed *post mortem* by an intimate partner, his (or rarely her) parents or the courts.

The issue of what form of consent may be regarded as sufficient has recently been disputed. Tremellen and Savulescu (2015) attempted to re-orient the debate by arguing that the default position should be presumed consent to the procedure of PHR. Kroon (2015) responded critically by first discussing the standard positions on consent, and then challenging Tremellen and Savulescu's liberal position by analysing the status of sperm using two alternative models: one, perceiving it as a purely genetic resource, and the other, viewing sperm through a relational lens.

Other arguments in favour of restricting PHR, but not centered on the issue of consent, include respect for the integrity of the deceased person's body (Orr and Siegler, 2002); concern for the psychological well-being of the future child, who would be an orphan (Bahadur, 2004; Landau, 1999, 2004; Pennings et al., 2006; Pobjoy, 2007; Samani et al., 2008) and might be expected to serve as a 'living memorial' to his/her late father; and feminist concerns regarding pressures placed on bereaved female partners to continue the name/sperm/genes of the deceased (Bahadur, 2004; Landau, 1999; Shalev, 2002).

By contrast, proponents of PHR claim that denying the widow/partner the use of the sperm would infringe on her reproductive autonomy (Simpson, 2001). Further, from the future child's perspective, it is impossible to argue that non-existence is preferable to being an orphan or to any other sort of existence (Bahadur, 2004), especially in societies in which anonymous sperm donation is common practice.

These two scenarios can be considered 'classical-modern' PHR situations; yet interestingly enough, the third scenario (brain-dead PHR) is the one that has drawn the most attention in Germany (see below), though it is hardly discussed under the rubric of PHR in other national or international academic contexts. This scenario shares a number of similarities with the first two, especially in situations where IVF treatments have already commenced with the intention of having a child, or where sperm are retrieved from a man when he is comatose, brain dead or *post mortem*. We would therefore contend that it is reasonable to include it in a general consideration of PHR.

With this anomaly in mind, this study moves on to a description of PHR policies in Israel and in Germany, the differences between them and possible explanations for these distinctions.

Differences in German and Israeli PHR policies and histories

When discussing the regulation of new biomedical technologies, Israel is repeatedly depicted as morally enthusiastic and liberal, as opposed to Germany, which is seen as restrictive and apprehensive. Ahluwalia and Arora (2011), for example, in their review of PHR regulations in several nations, categorise Germany, like Sweden, Italy, France, Canada (with the exception of British Columbia), Hungary, Slovenia, Norway, Malaysia and Taiwan, as having restrictive policies. Hans (2008) also classifies Germany as not allowing posthumous reproduction, while Israel is frequently portrayed as extremely permissive in this regard (Tremellen and Savulescu, 2015). Yet it is argued below that the placement of these two nations on opposite sides of the regulatory spectrum is correct only if we consider the first scenario and (most instances of) the second one but totally disregard the third. It is our contention that thinking of PHR in a non-comparative way, as a global phenomenon, can lead to two interrelated mistakes: the first having to do with the way that PHR policies in different societies are classified and understood, and the second, with overlooking some of the gendered and embodied dimensions of PHR.

Israel

In 2003, Israel's Attorney General (hereafter IAG) issued formal regulations permitting PHR for deceased men. The regulations outlined a two-step procedure (Landau, 2004): retrieval of sperm from a dying or deceased man at the request of his female partner, whether married or not; and court authorization to use the sperm, determined on a case-by-case basis, taking into consideration the deceased man's dignity and presumed wishes. About ten years later, the Mor-Yosef Committee (Israeli Health Ministry, 2012), which was appointed to propose recommendations for unified legislation regarding assisted reproduction, recommended that PHR be permitted in cases of deceased women as well. However, no such law has yet been enacted.

The Israeli policy is based on the assumption of 'presumed wish', namely, that a man who lived in a loving relationship with a woman would wish her to carry his child after his death (Ravitsky, 2004). Leaving the world without offspring was a concern among ancient Israelites and seems to continue to guide contemporary policy, which promotes the desire for genetic continuity and for existence after death by leaving offspring. Other arguments supportive of the 'presumed wish' legal solution raise evolutionary, patriarchal or instinct-based justifications; these assume that all men, dead or alive, are interested in the spread and continuation of their genetic line, and that all couples wish to procreate (Hashiloni-Dolev and Triger, 2016; Landau, 1999; Shalev, 2002). The assumption is that although the specific individual is dead, as long as fertile gametes exist the lineage is potentially not dead; hence the policy respects this possibility and allows it to be realized.

A related issue – posthumous grandparenthood (hereafter PHG) – is the subject of debate among policy makers and executors in Israel, and is in fact what makes Israel an exceptional case. We are referring to cases where it is not the biological father or mother but the potential grandparents who request the use of gametes of their deceased adult

child – whether or not he/she had a partner in life, and with or without the consent of that partner.

According to the IAG regulations of 2003, which still represent the official policy, parents have no legal standing regarding the gametes of their deceased child. But notwithstanding these regulations, more than ten requests have been submitted to Israeli family courts over the past decade by parents seeking permission to use their deceased son's sperm to create genetic grandchildren, based on agreements between them and single women who did not know their son but who wished to use his sperm to become the mother of their future grandchild (Rimon-Greenspan and Ravitsky, 2013). Contracts between future mothers and grandparents have been signed, and in 2013 the first two court-approved babies were born, creating a new type of family in which the mother used a non-anonymous dead man's sperm to conceive, and in which the procedure was initiated by the deceased's parents, who thus became post-mortem grandparents.

Contrary to this permissive approach on the part of the family courts, the Mor-Yosef Committee (an advisory body on assisted reproduction and surrogacy that convened in 2012) took a more conservative stance and – in line with the earlier IAG regulations – precluded parents from the posthumous use of their son's sperm. In 2013, however, the new IAG approved a petition for posthumous grandparenthood (Magenzi, 2013), though no formal document has been published on the subject. Additionally, in late 2014, the parents of a young deceased man, together with a woman who wished to be impregnated with their son's sperm, were given court permission to use the sperm, with no need to testify as to the wishes of the dead, which were unknown (Cohen-Friedman, 2014), and the debate is not yet over. In September 2016, an Israeli judge decided in favour of parents who are planning to raise their grandchild on their own, using a surrogate and an egg donor who will not actively parent the child (Rimerman, 2016). If their wish is realized, another form of new family will come into being.

The groundbreaking case in this regard is that of Keivan Cohen, a 19-year-old soldier killed in 2002 in Gaza, whose case was the first in which parents demanded and ultimately won legal permission to use their son's sperm post mortem. In a documentary called *Something from Me* (Beider and Ben-Baruch, 2014) telling the story of Keivan's daughter, who was born to a single mother chosen by the future grandmother Rachel, the bereaved mother describes the moments after she was informed of her son's death:

> I immediately understood that I no longer had him. I had a picture of us together at an army ceremony, and I talked to it [the photo] and asked him: 'What is left of you? How can I save something from you? Soon you'll be buried, and nothing will be left of you. What am I going to do now? Tell me what to do'. and I hear him, I really hear him tell me: 'Mommy, it's not too late, you can take my children'. So suddenly I say to myself: Wait a minute, there is something! His seed is still alive [our emphasis], it's alive for another 24 h, and he was killed only 3 h ago. and I start making calculations how I can save the last little bit of something from him.

As we can see, though cases of PHG are still debated in Israel, they are becoming more and more accepted, building on the same logic that the family lineage or perpetuation of the bloodline does not end with one's death. Life can be continued, according to this thinking, and in fact never totally stops as long as potent gametes exist. The Israeli media often sympathize with partners and even potential grandparents seeking PHR. The parents' struggle is commonly depicted as extremely sad but at the same time heroic as it 'chooses life over death'. In Israeli culture, the death of young men is strongly associated with the military, and criticizing grieving parents is a social taboo. This attitude is also echoed in PHR scenarios that result from 'non-heroic' deaths due to illness or injuries. Indeed, Israel appears permissive if we concentrate on PHR scenarios (1) and (2) above. However, after examining the German situation, this study challenges this clear-cut observation, and shows that while the importance of the continuation of the bloodline pushes towards permissiveness, other factors act as a restraining force.

Germany

In contrast to Israel, the major focus in Germany has been on scenario (3), involving PHR after brain death. In 1992, the case of the so-called 'Erlanger baby' was hotly debated, and its legacy still lingers (Bockenheimer-Lucius and Seidler, 1993; Echinger, 2015). In this case, an 18-year-old single woman suffered serious cranio-cerebral trauma and became comatose following a car accident in the Bavarian university town of Erlangen. When the medical team approached the parents about potential organ donation, they informed the doctors of their daughter's pregnancy and her reluctance to donate organs. The pregnancy, then in the first trimester, had been overlooked by the doctors. Intensive treatment was continued, but after three days the woman was declared brain dead. The clinical team, supported by an ad hoc ethics committee, decided to artificially sustain the woman's bodily functions in order to continue the pregnancy. However, five weeks later, a spontaneous abortion occurred. After this, artificial respiratory support was withdrawn and an official declaration of death was issued.

The case was the subject of intense discussion in the media as well as in academic circles. One reason was that at the time Germany had no explicit transplantation law, and this was the first case to prompt discussion of brain death as a sufficient criterion for establishing death. Additionally, communication problems between the parents and the medical team fueled the conflict and the media drama, with the doctors being criticized by the media for using the case to appear progressive but not caring sufficiently about the family or ethical concerns. The parents of the deceased woman were initially against preserving their daughter's vital functions only to sustain the pregnancy, but later supported the appointment of another legal representative (an aunt of the brain-dead woman), who agreed to the continuation of life support.

At least two other cases in Germany (in 1991 and 2009) are documented where brain-dead mothers in later stages of pregnancy were artificially kept 'alive' for several weeks until a healthy child was born via Caesarean section. Since confidentiality was maintained in both cases to protect the families, media and academic commentaries are rather limited (Echinger, 2015).

In contrast to Israel, scenarios (1) and (2) are rarely discussed in Germany, most likely because the country's Embryo Protection Law (ESchG), enacted since 1990,

explicitly forbids the use of the sperm or eggs of a dead person for artificial insemination. However, a 2009 case was the first to establish the legal permissibility of PHR in Germany involving cryopreserved gametes (Sternberg, 2010).

In 2008, after six years of childlessness, Ines S. and her husband Sandro S. decided to attempt IVF. When the first IVF treatment failed, nine unused zygotes were cryopreserved. Soon after the procedure, Sandro was killed in an accident and when Ines tried to claimed the frozen zygotes shortly afterwards, the clinic, supported by a local court, refused to provide them on the grounds of the Embryo Protection Law. However, the Higher Regional Court in Rostock ultimately decided that her claim was legal because the zygotes were stored in their pronuclear stage (i.e. before the nuclei fuse), and her husband's sperm had already been used before he died and were now inseparably embedded in the oocyte. So while it was legally forbidden to impregnate an oocyte with a dead man's sperm, a pronuclear zygote was defined not as an embryo but as the product of a process of impregnation that was already underway. Therefore the release of the zygotes was permitted, as the law did not forbid the finalization of a process that had already begun. Nonetheless, the Court stressed the complexity and exceptional nature of the case. Ines S. herself went to Poland for IVF treatment, but the zygotes were no longer viable. She justified her legal battle by arguing that after her husband's death she wanted 'a piece of him to remain alive' (Von Aglaja, 2010), which is very similar to how bereaved partners and parents in Israel explain their petitions. The legal case highlighted the contentiousness and lack of clarity regarding when exactly artificial insemination is completed (Büchner, 2010), and critics argued that the Embryo Protection Law needed to be revised (Spiewak, 2010). As for the public, they were quite sympathetic to the widow's request (Der Spiegel, 2010; Simon, 2010; Wolff, 2010).

In general, the moral status of children as something to be welcomed and encouraged made these PHR cases possible in Germany, but what evoked different attitudes in the media and the public was the motivation of the major agent pleading on behalf of the process. In the cases of successful motherhood after brain death, it was the male partner who received sympathy and understanding, as did Ines S. Wanting to continue fertility treatments or a pregnancy despite the death of the father or mother, and wishing to raise the future child is perceived as an understandable and respected form of grief and mourning (Simon, 2010; Wolff, 2010). Furthermore, the moral and quasi-legal status of the embryo or even fetus as an entity in its own right constitutes a strong reason for continuation of pregnancies. However, as the case of the Erlanger Baby demonstrates, the perceived role of physicians as protectors of new life, coupled with the fact of a missing male partner (and thus the absence of both future parents), gives rise to reservations. Additionally, in the case of Germany, the fact that the definition of brain death is still continuously criticized by a minority of the public and academia underscores concerns of moral and epistemological hybridity related to pregnancy in brain-dead women (see below).

To summarize, classifying Germany as restrictive with regard to PHR does not take into account cases of brain-dead pregnant women, or even the case of Ines S., and thus it is to some extent incorrect. The following discussion of gender may indicate that, contrary to the conventional wisdom, Israeli society is not always as supportive of PHR as has been suggested.[5]

The relevance of the gender dimension in PHR

In what cases is PHR allowed when the deceased parent is a mother? As stated earlier, the most frequently discussed scenarios in the international academic literature dealing with PHR typically disregard the less common situation in which the deceased parent is the mother. A Google search with the words 'posthumous' and 'motherhood' yielded a troubling article titled 'A Match Made in Heaven: Posthumous Fatherhood and Postmenopausal Motherhood' (Fisseha, 2007), comparing dead men to menopausal women, but not to their actual equivalent, namely, dead women. Yet PHR can take place applying the relatively new egg-freezing technique known as vitrification (fast-freezing), which makes it possible to freeze women's oocytes for lengthy periods of time (Bernstein and Wiesemann, 2014). Women can freeze eggs to preserve fertility for a later age or, like men, because of cancer treatments or life-threatening occupations or pastimes. In the event of the death of the potential genetic mother, it is possible to fertilize the egg with male sperm and then implant the pre-embryo in the body of a surrogate mother. Additionally, pre-embryos frozen at a fertility clinic can be used following the death of both genetic parents. In one well-known case, an Israeli man whose wife died of cancer used their frozen pre-embryos to create a child (Hashiloni-Dolev, 2015). Since the procedure was illegal in Israel, he used the services of an American surrogate mother. When the gender perspective is mentioned in the literature, emphasis is placed on the fact that surviving males must contract with surrogates (introducing additional complexity to the process of PHR), whereas third parties are not needed by surviving females (Antall, 1999; Hans, 2008). Moreover, there is the common belief that mothers make better parents, which leads to more positive public attitudes towards PHR when the surviving partner is a woman (Hans and Dooley, 2014). This is related to the widely shared stereotype presenting men's parental interests as minimal, only instrumental or financial in contrast to those of women. These gendered stereotypes can also be detected in the ethical and public debates in Germany and Israel (for a detailed analysis of this bias in the US legal context, see Purvis, 2015).

It seems plausible, then, that PHR involving a deceased male parent attracts more attention due to biological and technological differences that make posthumous motherhood harder to pursue, though specific gender stereotypes are obviously at play here as well. It is not widely noticed, however, that the scenario of brain-dead pregnant women is rarely discussed in the context of PHR outside of Germany, despite the fact that such cases happen from time to time and are likely to recur. Thus, it is interesting to note that while the ESHRE task force does address posthumous motherhood, it does not include brain-dead pregnant women in its discussion as it considers them not directly relevant to medically assisted reproduction (Pennings et al.,

[5] In contrast to pre-implantation diagnosis and euthanasia, we could not find any hint of the legacy of Nazi medicine or the Holocaust in the academic or media discussion of PHR.

2006). Based on its research in Germany, this study aims to challenge this categorization, and show that it is culturally bound.

The situation of a brain-dead pregnant woman embodies both the beginning and end of life. It points to the complexity of the moral, cultural, and legal entanglement between pregnant woman and embryo, viewed either as a unified entity or as two separate moral subjects, and the social ambiguity of the concept of brain death (the person is conclusively dead, in an irreversible process of dying, or still alive). While the predominant ethical dilemmas haunting PHR, such as respect for the deceased's wishes (and the inability to know them for certain) and the best interests of the future child, are pertinent in this scenario as well, there are other important considerations including the fetus's right to life balanced against respect for the mother's dead body, the moment and definition of death, possible medical damage to the fetus and experimental medical treatments (Anstötz, 1993). As mentioned earlier, brain-death PHR scenarios have occurred in Germany and drawn considerable attention. But what is the situation in Israel? While Israel is depicted as extremely permissive in its attitude towards PHR, no cases in which brain-dead pregnant women were kept 'alive' have ever been reported in Israel (although it is possible that they occurred, but word did not reach the media or academia). The general legal position in this regard in Israel as well as in Germany is that the father has no legal status enabling him to decide about his partner's pregnancy as the embryo/fetus and the partner are not under his custody.

The Israeli cases relating to brain-dead motherhood are very different from those in Germany. In 1989, a judge rejected a hospital's request to deliver a 26-week-old fetus whose mother was brain dead; the father had asked the doctors to let the fetus die together with its mother (District Court of Jerusalem, 1989). The question was not whether the woman's body should be kept artificially 'alive', but whether it was permissible not to rescue a viable fetus from its dead mother's body. The judge ruled in favour of the father for two reasons: first, the fetus was not protected under the Capacity and Guardianship Law of 1967 as it had not yet been born, and second, the operation was not necessary to protect the mother's life.

Three years later, a similar case ended with the opposite verdict. Again, a family was fighting against doctors who wished to rescue a 28-week-old fetus from its sick mother in case her condition deteriorated and she became brain dead. The mother's family (both husband and parents) did not want to separate the child from its mother (Halperin-Kadary, 2002) and were unwilling to raise the child in the event of the mother's death. However, the judge in this case argued that the relevant law if the mother became brain dead was the Anatomy and Pathology Act (1953) and specifically section 6c, which states clearly that the delivery of a child from a dead pregnant woman is not considered 'surgery' and hence does not require the consent of the deceased's relatives. In light of this, the doctors were permitted to perform a Caesarean section in order to save the fetus at this advanced stage of pregnancy. Although it was unclear whether the fetus had a right to life or not, given the mother's condition the fetus clearly no longer posed a threat to her life (which always takes priority in Jewish law over that of the fetus). The judge reasoned that under Jewish law the fetus in this case must be saved, while according to state law, the doctors were permitted – though not obligated – to do so. Ultimately the mother's condition improved, and she gave birth to a healthy child.

Although since 1992 doctors in Israel are permitted to act against the family's wishes, no published evidence of such cases was found. Caesarean sections are performed to save viable babies, and are sometimes reported in the news, but if there are occasional conflicts between families and doctors in this regard, or cases where the fetus or embryo is left to die together with its mother, they do not reach the courts or the head the comparison with Germany, the situations are obviously very different: the Israeli cases do not fit the third categorization of brain-death PHR, as the option has not been offered (to date) to keep a brain-dead pregnant woman's body artificially functioning for the sake of her future posthumous child. These cases in fact run counter to the ancient practice of delivering a child from a dying mother by Caesarean section, and have nothing to do with modern technologies explicitly implemented to maintain pregnancy after the mother has been declared brain dead.

How is it possible, then, that one society (Israel) which warmly endorses PHR by cryopreserved gametes does not use current technologies to prolong pregnancy in cases of brain death, while another society (Germany) that forbids PHR by gametes utilizes technology differently in the case of brain death in early stages of pregnancy and allows PHR when zygotes already exist? To attempt to answer this complex question, this study will now tie together the gender perspective with attitudes towards the beginning and ending of life from a cross-cultural standpoint.

Discussion: a reflection on differences between contexts

The answer, based on comparative analysis, is structured around four leading questions which we suggest should be included in any future analysis of PHR to reflect cultural contexts in a more explicit manner:

a. What is the perceived relationship between the embryo/fetus and its mother?
b. When does life/reproduction begin according to different belief systems, and what is the resulting moral and legal status of the gamete/zygote/fetus/embryo?
c. How final is death *per se*, and brain death in particular?
d. Who is the social agent(s) seeking to have a child?

In terms of both legislation and expert opinion, Germany and Israel represent opposite regulatory approaches and positions in bioethical debates concerning the first three issues (Hashiloni-Dolev, 2007; Raz and Schicktanz, 2016). Based on the present study, we wish to suggest that such positions have a major impact on the field of PHR.

In Israel, an embryo, and even a fetus, has no separate moral status as a 'live entity' (Hashiloni-Dolev, 2007); hence doctors are not expected to act as protectors or advocates of the embryo/fetus against its mother or family. As noted above, even if Israeli doctors do not share this strict

conceptualization of the unity of mother and fetus, they do not receive cultural approval for attempts to separate the fetus. Furthermore, it is not only the embryo/fetus that is not seen as a separate entity from its mother/family; the future child is also considered in a more relational manner (Hashiloni-Dolev and Shkedi, 2007). Thus a child without a mother – that is, a living mother, or an involved family – is less attractive to the Israeli imagination, where parenthood is mother-centered.

By contrast, in Germany the doctor's duty to protect the embryo is enshrined in both the German Embryo Protection Law and the country's abortion law, creating a possible legal conflict between the mother-fetus unity and the fetus's own right to life (Deutscher Ethikrat, 2013). Male parental interests are still however neglected in this scenario. This contentious situation tends to lead to case-by-case decisions, and may encourage doctors to take sides in the conflict.[6] The German position towards the fetus reflects a family ethic in which the embryo/fetus is seen as more separate from its future family and thus deserving of individual protection (Hashiloni-Dolev and Shkedi, 2007). However, the German situation, as we understand it, is not comparable with for instance the Polish context, where fetal 'citizenship' is a recognized concept (Holc, 2004; McCulloch, 2012). Under this approach, protection of the fetus supersedes the interests and wishes of the expectant parent(s), with fetal rights asserted in some cases even with regard to property, citizenship or succession.

The relationship between the mother and her future child is strongly connected with the contemporary view of the beginning of life. The social and legal difficulty of drawing clear-cut lines as to when life begins in the present medico-technical era helps explain the controversial German case of Ines S. in which the court felt almost overwhelmed by the difficulty of the decision and ultimately argued that the process of impregnation had already commenced. However, this argument is countered by the legal distinction otherwise made between pronuclear zygotes and so called finalized zygotes. Only the former are allowed to be frozen as surplus and discarded if not used (Kalff-Suske, 2007). Hence the supposedly straightforward technical differentiation between the stages of the beginning of life does not prevent a lack of clarity in the legal and social spheres. This conceptual hybridity can work both ways, sometimes supporting and other times restricting PHR. Earlier research has shown that Jewish-Israeli culture grants the status of life, and thereby social protection, at a later point than contemporary Christian cultures (Lavi, 2010; Rimon-Zarfaty et al., 2011), and that in Germany the very early stages of life are highly protected (Krones et al., 2006). While this situation often makes Germany restrictive regarding new reproductive technologies, in the case of Ines S. it made PHR legally possible. Conversely, the weaker protection of early stages of life in Israel makes the third PHR scenario (involving a brain-dead mother) unlikely in Israel but more likely in Germany, where embryos inside the mother are granted more social protection in legal situations.

[6] There is no known case in Germany similar to that in Texas, where the withdrawal of intensive/respiratory care for a brain-dead pregnant women was forbidden in light of her presumed wish, and that of the potential father, to protect the embryo (Purvis, 2015).

But thinking solely from the perspective of the beginning of life is not enough. The end of life and its sociocultural meanings are also highly pertinent. The cases of brain-dead mothers in particular indicate that the acceptance of modern definitions of death is of major importance. Health professionals are not just facing a conflict of interest between ending life-support for the brain-dead mother and supporting the fetus (which is experienced as a dilemma far more strongly in Germany than in Israel); the cases of brain-death PHR have also revealed an existing skepticism towards the concept of brain death itself. This distrust exists partly within the German health profession (Söffker et al., 2014), though it is also a critical factor among ethics experts and the wider public (Müller, 2010). In Israel, by contrast, criticism of the concept of brain death does not come from medical circles, and is not the only controversial issue regarding decision-making at the end of life. In fact, the Israeli view of end-of-life is more restrictive than the German one (Hurwitz et al., 2006; Schicktanz et al., 2010) in the sense that actively ending life, including withdrawing life support, is not permitted even if the patients and the family wish it. This can be interpreted as placing a very high value on the sanctity of life (Doron et al., 2014); yet this support does not apply to pre-viable fetuses, as this study has shown. Thus despite Israel's perceived enthusiasm regarding PHR and Germany's perceived restrictiveness, in the case of brain-dead pregnant women the picture as a whole is actually quite the opposite.

Another way of thinking about the margins of life is to ask what different cultures mean by 'not totally dead', 'still alive' or 'a certain form of life'? We would contend that in Israel the supporters of PHR are essentially arguing that it should be allowed because even after death, not everything dies, meaning death is not final. The most relevant example would be the story of Rachel Cohen above, who claimed to hear her dead son telling her that part of him was still alive. Further, the rationale of Israel's policy suggests that even after death, the bloodline, or the love relationship between partners, can remain alive with PHR. While lay people in Germany may think and talk in the same terms, as shown by the case of Ines S., this is not reflected at the policy level. In Germany, brain death is not completely accepted as final, and the pronuclear zygote already has the status of life to some – positions that we would submit are as symbolic and cultural as the 'life' of the sperm or the family lineage in Israel. Hence, our principal argument is that PHR practices should be understood in light of diverse interpretations of the margins of life and death.

The final essential question emanating from the controversy over PHR in both countries is not related to the boundaries of life and death but centres on the agent(s) seeking to have the child and raise it. When doctors interfere in this matter, as in the German Erlanger case, controversy seems likely to ensue. On the other hand, when intimate partners of the dead wish to have the child and parent it, also in the case of Germany, they receive sympathy from both the media and the public (Echinger, 2015; Eusterhus, 2012; Simon, 2010). This is also true of Israel, where policy has made it easy for such partners to pursue PHR; yet when grandparents are the agents, there are more conflicts among policy makers and among the public, as indicated by a preliminary study regarding young couples' attitudes towards PHR (Hashiloni-Dolev, 2015). The latter

scenario seems to evoke a stronger 'yuck factor' among young Israelis, as some of them resent the idea of their parents 'messing with' their fertility or sex organs. Nonetheless it is clear that local family norms impact on who can be thought of as legitimate agents in this regard.

Adding the perspective of the agent seeking a child into this study's analysis regarding Israeli society, it can be conclude by saying that once there is an active, socially accepted actor wishing to 'continue life', the boundaries between life and death are quite easily eroded; however, if there is no such agent, death can be final, and no protection is granted to the early stages of life, as has been the case throughout most of history.

Looking at PHR from the German perspective, it becomes clear that the boundaries of life and death in that country are not as precise as policy makers or the public might wish: the social acceptance of brain death as the definition of death is not universal in Germany – even if the majority of professionals would officially support cessation of brain activity as the criterion for establishing death. Furthermore, there is uncertainty as to the point when life begins. These two factors can lend themselves to unexpected PHR scenarios, as we have shown.

Conclusion

In the academic literature, PHR is commonly associated with two key ethical dilemmas: informed consent, and the welfare or best interests of the future child. Analysis from this study, which is based on a cross-cultural comparison of PHR in Israel and Germany, takes a different route, stressing how the fact that PHR cuts across the boundaries of life and death affects the way it is regulated and discussed in two different societies. Using a comparative and gender-sensitive perspective, this study challenges the common classifications of PHR scenarios, bringing brain-dead pregnant women (who embody both the beginning and end of life) into the discussion. Additionally, it is demonstrated that a thorough examination of these two different societies in the context of PHR problematizes their categorization as permissive/restrictive, since Israel does not practice brain-death PHR[7] while Germany's restrictiveness is not absolute. In exploring the regulatory as well as the ethical public discussion of posthumous reproduction, how different societies police the borders of life and death was emphasized, addressing such questions as: How early does life begin? What is the relationship between a pregnant woman and her embryo/fetus? When does life end, and death become final? Which parties are legitimate social agents who are permitted to straddle the margins of life and death, and which are less so?

We believe that these questions, the answers to which shift across cultures and time, can enrich the debate surrounding PHR, given that policies will likely continue to be contested in both countries and beyond as a result of the advancement of the relevant techniques and the changing of related social norms. We hope that this analysis will contribute to future discussion, despite the obvious difficulties in dealing with this unique and troubling subject.

[7] During the final revisions on this paper, Israeli media reported a rare (and likely first) brain-death pregnancy in Israel. After the mother was declared brain dead in the 26th week of gestation, the pregnancy was sustained for five more weeks, with the outcome of a healthy premature baby. The story did not attract much media attention, nor did it generate controversy. We understand it to be an example of how posthumous birth practices are shifting everywhere, rapidly changing previously-held norms. http://www.ynet.co.il/articles/0,7340,L-4871501,00.html (Hebrew).

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